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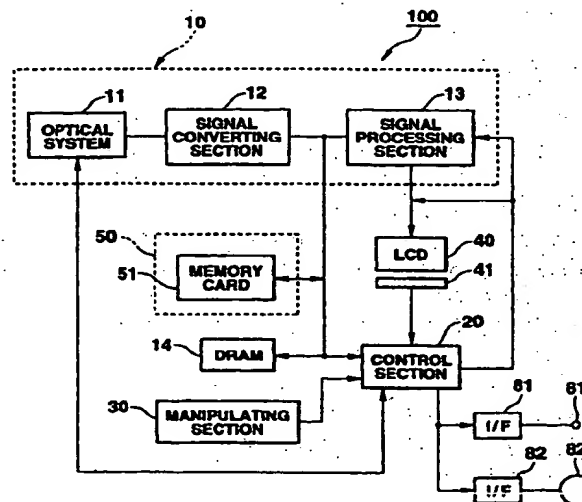
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(54) Electronic camera system

(57) According to the present invention, in an electronic camera system (100), when picking up or reproducing an image, a printing condition setting section (30) successively displays a printing condition menu in a state of overlapping with an image so that a user selects a desired menu. Printing conditions such as the number of printing sheets or printing size set by the user are recorded in a printing condition registration list on a memory card (51) related to the picked-up image or to an image read from the memory card, which is being reproduced and displayed. A printer system (61) prints an image according to a stored content when the memory card (51) is mounted onto a printer.

FIG.1A



## Description

[0001] The present invention relates to an electronic camera system.

[0002] This application is based on Japanese Patent Application No. 9-334853, filed November 20, 1997, the content of which is incorporated herein by reference.

[0003] In recent years, a digital camera has been developed and come into the market.

[0004] A subject image picked up by the digital camera is recorded as image data in a recording medium via photoelectric conversion by a CCD, etc., signal conversion, signal processing and the like. Image data recorded in the recording medium is read out, and then, it is possible to reproduce and display the image data on a display device such as a liquid crystal display or the like.

[0005] It is possible to output or transmit the image data recorded in the recording medium to an external equipment such as a printer, a personal computer or the like.

[0006] Following three methods are employed in order to print an image which is picked up by the digital camera, and is recorded in the recording medium. More specifically,

(1) in the case where a digital camera records image data in an internal recording medium (fixed type) such as a flash memory or the like, there is a method of transmitting the image data to a personal computer so as to be recorded in a recording medium on the personal computer side, reproducing the recorded image by the personal computer so that a plurality of thumbnail images (reduced image) are displayed on a monitor, and selecting a desired image from the plurality of images and printing it with the use of a printer;

(2) in the case where a digital camera records image data in a removable recording medium such as a memory card or the like, there is a method of connecting a recording medium reader to a personal computer, capturing the image data from the removable recording medium in the personal computer, reproducing the recorded image and displaying it on a monitor, and printing a desired image with the use of a printer; and

(3) there is a method of selecting an image by a digital camera, directly outputting or transmitting the selected image to an external printer, and thus, printing the selected image.

[0007] Among these methods, the above methods (1) and (2) needs to take some steps to record the image in the recording medium on the personal computer side and reproduce it, and select a desired image after displaying the image on the monitor. Therefore, a camera user must take troublesome procedures for printing the image, and in addition, must prepare a personal computer for image printing.

ter for image printing.

[0008] On the contrary, the above method (3) outputs an image directly to a printer, so that printing can be carried out without preparing a personal computer. However, in the case of printing a desired image, there is a need of reproducing an image recorded on a recording medium such as a flash memory or a memory card, and repeating an operation for displaying the image on a camera or a liquid crystal display of the printer until the desired image is shown, and thereafter, carrying out the printing operation. Therefore, it is impossible to previously know where the desired image is recorded in the recording medium; therefore, a user must perform the above operation every printing. Further, there may arise a problem that the user must see all of the recorded images or the last image thereof.

[0009] In any cases, printing conditions such as printing mode or the number of printing sheets need to be set at the time of printing. Therefore, the printing procedure is troublesome. Further, in the case of making a request to print to other persons, the user must give printing conditions or the like to other persons in detail.

[0010] Accordingly, it is an object of the present invention to provide an electronic camera system which can easily print a desired image without setting printing conditions at the time of printing.

[0011] According to the present invention, there is provided an electronic camera system comprising:

an image pickup optical system including a pickup lens and an image pickup device;  
an input device for inputting a printing condition by a user;  
a memory which stores an image picked up by the camera optical system and is removable with respect to the electronic camera system; and  
a memory controller for writing the printing condition input from the input device in the memory so as to correspond to the image picked up by the camera optical system.

[0012] The printing condition includes the number of printing sheets, a printing size, or grouping of image to be simultaneously printed.

[0013] According to the present invention, there is provided another electronic camera system comprising:

an image pickup optical system including a pickup lens and an image pickup device;  
an input device for inputting a printing condition by a user;  
a memory which stores an image picked up by the camera optical system; and  
an output terminal for outputting the image and the printing condition corresponding to the image from the memory.

[0014] The electronic camera system further com-

prises a display device for displaying a subject image when inputting the printing condition.

[0015] The display section includes a touch panel for inputting the printing condition with a finger touch.

[0016] According to the present invention, there is provided a further electronic camera system comprising:

- an image pickup optical system including a pickup lens and an image pickup device;
- a memory which stores an image picked up by the camera optical system;
- a memory controller for detecting a number of persons in the image picked up by the image pickup optical system and storing the detection result in the memory so as to correspond to the image picked up by the camera optical system; and
- an output terminal for outputting an image and the detection result corresponding to the image from the memory.

[0017] According to the present invention, there is provided a system comprising:

- an electronic camera; and
- a printer, in which the electronic camera system comprises:

- an image pickup optical system including a pickup lens and an image pickup device;
- an input device for inputting a printing condition by a user;
- a memory which stores an image picked up by the camera optical system and is removable with respect to the electronic camera system; and
- a memory controller for writing the printing condition input from the input device in the memory so as to correspond to the image picked up by the camera optical system, and in which the printer comprises:
  - a slot in which the memory is mounted thereto and removed therefrom; and
  - a printing section for printing the image stored in the memory in accordance with the printing condition corresponding to the image.

[0018] According to the present invention, there is provided an image picking up and recording method comprising the following steps of:

- picking up an image by an image pickup device;
- displaying the picked-up image;
- inputting a printing condition from an input section by a user; and
- storing the inputted printing condition in the memory so as to correspond to the picked-up image.

[0019] According to the present invention, there is pro-

vided another image picking up and recording method comprising the following steps of:

- reading an image stored in a memory;
- displaying the read image on a display device;
- inputting a printing condition from an input section by a user; and
- storing the inputted printing condition in the memory so as to correspond to the read image.

[0020] This summary of the invention does not necessarily describe all necessary features so that the invention may also be a sub-combination of these described features.

[0021] The invention can be more fully understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:

FIG. 1A is a block diagram showing a circuit configuration of a digital camera of an electronic camera system according to a first embodiment of the present invention;

FIG. 1B is a detailed block diagram of a control section shown in FIG. 1A;

FIG. 2 is a perspective view (rear view) showing the digital camera shown in FIG. 1A according to the first embodiment;

FIG. 3 is a view showing an appearance of a printer including a memory card reader;

FIG. 4 is a view to explain printing conditions shown in a print condition registration list;

FIG. 5A is a block diagram showing a printing image output section;

FIG. 5B is a detailed block diagram showing printing condition setting section of FIG. 5A;

FIGS. 6A, 6B, and 6C are views to explain an example of printing condition setting operations;

FIGS. 7A and 7B are views showing examples of an image group selection menu;

FIG. 8 is a block diagram showing a configuration of a color processor circuit of a signal processing section;

FIGS. 9A, 9B, 9C, 9D, and 9E are views to explain an automatic setting operation for printing conditions in a group image;

FIG. 10 is a flowchart showing an example of an automatic setting operation for setting printing conditions at the time of pickup;

FIG. 11 is a flowchart showing an example of an automatic setting operation for setting printing conditions at the time of reproduction; and

FIG. 12 is a flowchart showing an example of an automatic setting operation for setting printing conditions at the time of pickup.

[0022] A preferred embodiment of an electronic camera system according to the present invention will now be described with reference to the accompanying draw-

ings.

[Circuit configuration]

[0023] FIG. 1A shows a circuit configuration of a digital camera as an electronic camera system according to a first embodiment of the present invention. A digital camera 100 includes an optical system 11, a signal converting section 12, a signal processing section 13, a DRAM (Dynamic Random Access Memory) 14, a control section 20, a manipulation section 30, a touch-panel 41, a recording section 50 and interfaces 81 and 82.

[0024] In the optical system 11, a subject image is focused on a CCD (not shown) located on the after-stage by a pickup lens (objective lens).

[0025] The signal converting section 12 converts an image formed on the CCD via the front-stage optical system 11 into an electric signal, and then, converts the electric signal into a digital data (hereinafter, referred to as image data), and thus, outputs the image data corresponding to one frame at a predetermined cycle.

[0026] The signal processing section 13 includes a color process circuit and a DMA (direct memory access) controller, and carries out a color process with respect to an output from the signal converting section 12 so as to produce a digital luminance and color difference multiplex signal (YUV data), and thus, transmits and expands the YUV data into a designated area of the DRAM 14 under DMA. The signal processing section 13 reads out the YUV data stored in the DRAM 14 in recording, and then, subjects the YUV data to a JPEG compression process. The image data recorded in a recording medium (memory card) 51 captured via the recording section 50 is subjected to an expansion process so as to reproduce the YUV data.

[0027] The control section 20 includes a CPU 21, a ROM 22, a RAM and a timer (not shown), as shown in FIG. 1B. The CPU 21 is connected to the aforementioned various sections and a power changing switch (not shown) via a bus line, and controls the whole of digital camera 100 according to control programs stored in the ROM 22. Further, the CPU 21 performs an execution control of each function of the digital camera in accordance with state signals from the manipulation section 30 and the touch-panel 41. For example, the CPU 21 performs execution control for realizing each function of the digital camera by executing various processing programs stored in the ROM 22.

[0028] The ROM 22 is a storing medium for storing the aforementioned processing programs and fixed values for executing other functions of the digital camera 100. A PROM, a FROM (Flash ROM) and the like are used as the ROM 22.

[0029] The RAM 23 is used for temporarily storing data or processed results and used as intermediate working area.

[0030] The manipulation section 30 comprises a processing mode changing switch 101, function selec-

tion buttons 31 to 35, a main switch 102, a printing image designation button 36, a shutter button 37, an image data output button 38 and a record/reproduction mode changing switch 103, which will be described later. When these switches and buttons are operated, state signals are transmitted to the CPU 21.

[0031] The display section 40 comprises a display unit such as a liquid crystal display (LCD), and displays a subject image thereon at the time of image pickup, so that a display screen can be used as a view finder. Further, the display section can display a reproduced image at the time of image reproduction. A position detection sensor (touch panel) 41 is provided on a liquid crystal display device constituting the display screen of the display section 40. The position detection sensor 41 comprises a transparent touch electrode which is turned on when touching it with a pen or finger. When the user touches a portion on the display screen, the touched portion is turned on, and thereby, the CPU 21 can obtain a coordinate value of the portion, and thus, the control is transferred to processing means for executing a process corresponding to the coordinate value.

[0032] The recording section 50 receives a recording medium 51, and records image data from the signal processing section 13 on the recording medium 51 according to the control of CPU 21. In this embodiment, the recording section 50 is constructed in such a manner that the memory card 51 used as the recording medium is removable, and data write/read is performed. The data write/read may be performed by an internal fixed-type recording medium such as a flash memory or the like.

[0033] As described later, the memory card 51 is provided with a printing condition registration list area for registering various image printing conditions. In this embodiment, a printing condition registration list 70 (see FIG. 4) which will be described later is provided.

[0034] The memory card 51 is constructed so as to be removable; therefore, the memory card 51 is changeable. The memory card 51 can be mounted onto a personal computer and a printer including a memory card reader. Thus, the personal computer and printer including the memory card reader can process or print the images recorded on the memory card 51.

[0035] FIG. 3 is a view showing an appearance of a printer including a memory card reader. As shown in FIG. 3, a video printer 61 is provided with a slot 62 for mounting the memory card 51, a power switch 63 and various operation switches 64.

[0036] Further, the video printer 61 is a sublimation type thermal transfer printer which performs an output of 8-bits 256 gradation (167 ten-thousands of colors) with respect to each of three primary colors, that is, R, G and B. More specifically, the memory card 51 is mounted onto the slot 62 of the video printer 61, and thereafter, when the power switch 63 is turned on so that various switches 64 are operated, the print image selector (which comprises programs in this embodi-

ment) provided in the video printer 61 makes reference to printing conditions of the printing condition registration list 70 stored in the memory card 51, and then, captures an image corresponding to the condition (operation results of various switches 64) instructed by the user. In this manner, the selected image is printed on a dedicated paper.

[0037] The interface 81 outputs the image data (YUV data) to an external printer via an output terminal 81' and a cable (not shown). Further, the interface 82 transmits the image data to an external printer including an infrared transmitter-receiver via an infrared transmitter-receiver 82'.

[0038] The image data outputted from the interfaces 81 and 82 may be only image data whose "printing designation" in a registration column 72 of the printing condition registration list 70 is set to data "1." By doing so, a transmission time is shortened, and it is effective in memory capacity on the external printer.

#### [Appearance of system]

[0039] FIG. 2 is a perspective view showing one example of the digital camera of FIG. 1 when viewing the digital camera from the rear thereof.

[0040] The digital camera 100 is provided with a processing mode changing switch (slide switch) 101 for changing a processing mode, function section buttons 31 to 35, a main switch 102 for starting up the digital camera 100, a printing image designation button 36, a shutter button 37 and an output button 38 on its upper surface.

[0041] The back side of the digital camera 100 is provided with a record/reproduction mode changing switch 103 for making a change-over of a record mode and a reproduction mode, an optical finder 105 and a liquid crystal display 40 which functions as an image display unit.

[0042] The front side (not shown) of the digital camera 100 is provided with a pickup lens and a finder.

#### [Processing mode]

[0043] The processing mode of the digital camera 100 is largely classified into a normal mode comprising recording and reproducing modes, and a special mode such as close-up pickup. A change-over of the normal mode and the special mode is made by changing the processing mode changing switch 101, and a change-over of the record mode and the reproducing mode is made by operating the record/reproduction mode changing switch 103. The branch to each mode by the change of these switches is performed by a mode discriminating means (comprising programs in this embodiment) which investigates state signals transmitted to the CPU 21 from the manipulation section 30 and branches to the corresponding mode processing circuit or program.

#### [Record mode]

[0044] The record mode includes a pickup mode and a record/reproduction mode. The pickup mode is a mode of displaying image data captured periodically from the CCD on the liquid crystal display 40 as a through image. On the other hand, the record/reproduction mode is a mode of recording image data displayed at the time when the user pushes down the shutter button 37 at a desired timing while visibly confirming the through image, from a non-volatile memory such as DRAM 14 to the memory card 51.

[0045] In the normal mode, when the user slides the record/reproduction changing switch 103 to a record side, the processing mode is changed to the record mode, that is, pickup mode. Then, during the pickup mode, when the shutter button 37 is pushed, the pickup mode is changed to the record/reproduction mode. Further, in the pickup mode, when the printing image designation button 36 is pushed, it is possible to set image printing conditions.

#### [Record/reproduction mode]

[0046] In the pickup mode, when the shutter button 37 is pushed, the mode is transferred to the record/reproduction mode, and an image displayed on the liquid crystal display 40 at that time becomes a still image (picture). Then, the content of image buffer of the DRAM 14 is subjected to a JPEG compression process, and then, is recorded in the memory card 51. In this case, if printing conditions are set together with the image data, designated image data printing conditions are related onto the memory card 51, and is recorded in the printing condition registration list 70.

#### [Reproduction mode]

[0047] In order to select the image, the reproduction mode includes a page feed mode and an output mode. The page feed mode is a mode of reading and reproducing the image data recorded on the memory card 51, and display it on the liquid crystal display 40. On the other hand, the output mode is a mode of outputting or transmitting a reproduced image data (image data and a scale data or synthetic image data) to an external equipment such as a personal computer, a printer or the like.

[0048] In the page feed mode, when the printing image designation button 36 is pushed, it is possible to set printing conditions of the designated image, and then, the printing conditions of designated image data are recorded on the printing condition registration list 70 on the memory card 51.

[0049] In the output mode, when the user designates printing conditions, it is possible to make a check of the printing condition registration list 70 and to output a designated group image to the external equipment.

#### [Printing condition registration list]

[0050] FIG. 4 is a view to explain printing conditions shown in the print condition registration list 70. The print condition registration list 70 is set in the memory card 51, and in the record/reproduction mode or the page feed mode, when the image designation button 36 is pushed, designated printing conditions are written into the printing condition registration list 70.

[0051] In FIG. 4, a serial number of the designated image is written in a registration column 71, and a flag (e.g., designated → "1," no designation → "0") indicating whether or not a printing output designation of the image by the user is made is written in a registration column 72. In a registration column 73, printing colors such as color, monochrome, black and white, when printing the image are coded, and the coded data (e.g., color → "1," monochrome → "2," black and white → "3") are written thereon. In a registration column 74, data indicative of print finish such as glossy, matting, normal is coded and written thereon, and in a registration column 75, a printing size of image to be outputted is coded and written thereon. In a registration column 76, the number of printing sheets is written thereon, and in a registration column 77, there are written a pick-up date generated by a well-know calendar generation means (not shown) at the time of pick-up (when pushing the shutter button 37), and a pickup time generated based on a timer. In a registration column 78, there is written a group code set at the time of pickup, for example, a group code indicating which the image belongs to an image group such as travel, sports, memorial day, ... etc.

[0052] Further, a plurality of registration columns may be provided so that the number of printing sheets can be designated for each size. In this embodiment, the registration column 72 has been provided so that the flag indicating whether or not a printing output designation of the image by the user is made can be written therein. Only printing output designation image may be recorded on the printing condition registration list without providing the registration column 72.

#### [Printing image output]

[0053] The control section 20 previously sets printing conditions based on the user's designation or automatically sets the printing conditions with respect to a desired image according to a printing image output section 110, and then, outputs image data together with printing conditions recorded in the printing condition registration list 70 when outputting image data.

[0054] The printing image output section 110 may be composed of a hardware circuit; however, in this embodiment, the printing image output section 110 comprises programs. Also, in modules of the printing image output section 110, a certain module may be composed of a hardware circuit; other modules may be composed of programs.

[0055] In the case where the printing image output section 110 comprises programs, each module of the printing image output section 110 is recorded on the ROM 22, and is executed and controlled by the CPU 21 according to control programs, and thus, image output process is realized in this embodiment.

[0056] FIG. 5A is a block diagram showing a configuration of the printing image output section 110. The printing image output section 110 basically comprises printing output designation discriminating section 111, printing condition setting section 112, and printing condition registration means 113. In this embodiment, further, image group section 114 and image group extraction/output section 115 are added to the printing image output section 110.

[0057] The printing output designation discriminating section 111 discriminates pickup data (still image data) after pickup or discriminates whether or not the printing image designation button 36 is pushed. In the case where the printing image designation button 36 is pushed, it is discriminated at the time of point that printing output designation is made with respect to a picked up image or reproduced image displayed on the liquid crystal display 40. The printing condition designation flag set in the DRAM 14 or RAM 23 is turned on (set to "1"), and then, the sequence is transferred to the printing condition setting section 112. In this case, a mark such as asterisk may be indicated to the image in which printing output designation is made.

[0058] The printing condition setting section 112 successively displays a printing condition menu in a state of overlapping with the image displayed on the liquid crystal display 40, and thereafter, the user selects a desired printing condition menu. The set printing conditions are coded and temporarily stored in each printing condition area set in the DRAM 14 or RAM 23 together with the aforementioned printing condition designation flag.

[0059] Also, it is possible to automatically discriminate the number of printing sheets on the basis of the number of persons existing in the image. As shown in FIG. 5B, the printing condition setting section 112 may be composed of a printing condition manual setting section 1121 for selecting printing conditions by the user, and an automatic printing condition setting section 1122 (described later) for automatically setting the number of printing sheets on the basis of the number of persons existing in the image or setting pick-up date and time. The pick-up date and time are printed automatically (or according to printing designation) in the case of printing the image, and besides, can be used as condition selection data in the case of designating a specified date and time relative to a search of pick-up images and images made in traveling and selectively printing these images.

[0060] Each of FIGS. 6A to 6C is a view to explain a printing condition setting operation. FIG. 6A shows an example that a printing color designation icon 46 is displayed in a state of overlapping with the image. When the user touches any of the icon 46 displayed on the dis-

play section 40 including a touch panel 41 with a touch pen or his finger, the touched icon is distinguishably indicated (e.g., is flashing) as a selection candidate, and then, when the user again touches the icon, the touched icon is inputted as being selected. When the user touches other icons, the differential indication of the previously touched icon is turned off, and then, a new icon is distinguishably indicated as a selection candidate. In the case of setting other printing conditions, by touching an icon 45, the icon varies as shown in FIG. 6B and FIG. 6C. FIG. 6B shows an example that a printing finish menu is displayed, and FIG. 6C shows an example that a printing size setting menu is displayed. In the same manner as the case of FIG. 6A, it is possible to set a desired printing condition. Further, it is possible to display a menu for the number of printing sheets (in the case where no automatic printing condition setting section 1122 is provided) and the image group (see FIG. 7A and FIG. 7B), and to set printing conditions in the same manner as described above.

[0061] In the case of displaying the printing size shown in FIG. 6C, a plural size designation menu is provided. In the case where a plural size designation icon is selected, an icon for setting the number of printing sheets is displayed in confirming condition setting (after touching a flashing icon), and then, an icon for confirming a size designation completion is displayed after setting the number of printing sheets, and thus, the number of printing sheets may be set for each size.

[0062] The image group selection section 114 displays an image group selection menu for selecting an image group to be extracted in the output mode on the liquid crystal display so as to prompt selection to the user.

[0063] Each of FIG. 7A and FIG. 7B shows one example of the image group selection menu.

[0064] When the user touches a desired primary icon 47 with a touch pen or his finger, the touched icon is distinguishably indicated as a selection candidate, and then, a pick-up date and time of the latest image relative to the touched icon is displayed on a date-and-time indication/designation portion 48. When the user touches the date-and-time indication/designation portion 48, a pick-up date of the new image next to the latest image is indicated. Thus, when the user touches the date-and-time indication/designation portion 48, a pick-up date of image is displayed in the chronological order from current (new) to past (old). Whereby the user can designate a specified date and time relative to a search of pick-up images and images picked-up in traveling, and can selectively make the printing designation for these images.

[0065] Further, when the user again touches the icon which is distinguishably indicating as a selection candidate, the icon is selected, and then, a secondary selection menu of the icon (group) is displayed.

[0066] FIG. 7A shows an example of the primary selection menu, and FIG. 7B shows an example of the

secondary selection menu. When the user twice touches a "travel" icon shown in FIG. 7A, a travel icon group 49 as shown in FIG. 7B is displayed. When the user selects the secondary icon 49 (e.g., Canada), the image group selection section 114 selects a code "Canada" as an extraction (sampling) key.

[0067] The image group extraction/output section 115 makes a comparison between the image group code (e.g., the registration column 78 in FIG. 4) of the printing condition registration list 70 and the selected extraction key, and then, sets the corresponding image number setting column 72 (see FIG. 4) to "1." Whereby it is possible to output the image and its printing condition data to the external equipment via the interface 81 or interface 82. When the data is outputted to the external equipment, data recorded in the setting columns 72 to 76 of the printing condition list 70 is cleared.

[0068] Further, when setting an output of the memory card 51 is set by the image group extraction/output section 115 and mounting the memory card 51 in a personal computer or a printer as shown in FIG. 3, including a memory card reader, it is possible to print out the aforementioned image.

[0069] In the case where "no designation" is selected in the primary selection menu, all of image data (and printing condition data) is outputted to the external equipment via the interface 81 or interface 82 without carrying out a secondary screen display and image group extraction.

[0070] Further, in the case where "no designation" is selected in the primary selection menu, only image having printing designation (image to which a mark such as asterisk is given, i.e., image of output designation flag of the setting column 72 being "1") may be outputted. In this case, the mark such as asterisk is outputted together, and then, may be printed together with the image.

[Automatic count of the number of persons (Number of printing sheets)]

[0071] According to the present invention, it is possible to automatically recognize the number of persons existing in a group image, and to discriminate the number of persons who were picked-up.

[0072] The automatic printing condition setting section 1122 discriminates a person who turns his face toward the front on the basis of color component of pickup image, and counts the number of persons. In this case, the person who turns his face toward the front is set as a discriminating subject, and thereby, the number of persons is counted except animals or passers-by (most of them turn their face toward the side), and thus, the number of persons who were picked-up can be automatically counted.

[0073] As described before (FIG. 1A), the signal processing section 13 includes the color process circuit and the DMA controller, and carries out a color process



with respect to an output from the signal converting section 12 so as to generate a digital luminance color difference multiplex signal (YUV data), and thus, transmits and expands the YUV data in a designated (specified) area of the DRAM 14 according to a DMA (Direct Memory Access). Therefore, a color component from the color process circuit is discriminated, and thereby, a discrimination relative to the persons is made.

#### [Color process circuit]

[0074] FIG. 8 is a block diagram showing a configuration of the color process circuit of the signal processing section 13, and each of FIGS. 9A to 9E is a view to explain an automatic printing condition setting operation of a group image.

[0075] As shown in FIG. 8, the color process circuit 131 comprises an R-component integrator 1311, a G-component integrator 1312, a B-component integrator 1313, an AE (Automatic Exposure (iris)) integrator 1314, an AF filter 1315, an AWB circuit 1317 and a signal synthetic circuit 1318.

[0076] An image signal obtained by photoelectrically converting the image by the CCD is converted into a digital signal by means of the A/D converter of the signal converting section 12, and then, is inputted to the color process circuit 131.

[0077] In the color process circuit 131, an input signal is subjected to a process for generating an automatic exposure (iris) (AE) signal, an auto white balance (AWB) signal, an auto focus (AF) signal, and Y, Cb and Cr signals, etc.

[0078] The AE integrator 1314 integrates the input signal, and then, outputs an integral value d. In order to detect a contrast auto focus high frequency component from the input signal, the AF filter 1315 passes the input signal through a high pass filter (HPF), and thereafter, outputs an integral value e. The AWB circuit 1317 outputs each integral value of components integrated by the R-component integrator 1311, the G-component integrator 1312 and the B-component integrator 1313. When these outputs are inputted to the control section 20, the control section 20 outputs a gain given to an AGC of the signal converting section 12, a shutter speed and a control signal for controlling the lens 101 on the basis of these signals.

[0079] A pattern of human skin color and cloth color component is previously registered in the automatic printing condition setting section 1122. In a pickup image composed of persons 91 and a background 92 as shown in FIG. 9A, a person color distribution curve (see FIG. 9E) is obtained on the basis of a difference in signal distribution between Y, Cb and Cr signals (see FIGS. 9B, 9C, and 9D), and then, a convex portion in the distribution curve in a predetermined threshold value is regarded as being a person image. Thus, by counting the convex portion in the distribution curve, it is possible to recognize the number of persons existing in the

forementioned pickup image.

#### [Printing condition setting operation in pickup]

[0080] FIG. 10 is a flowchart showing an automatic setting operation of printing conditions at the time of pickup, in particular, the number of printing sheets.

[0081] In the record mode, when operating the shutter button 37, an image is picked up (step S1), and then, when the mode is transferred to the record/reproduction mode, the picked-up image is recorded in the memory card 51 (step S2). The number of picked-up persons is automatically counted, and then, an automatic capture process of pickup date and time is executed (step S3). The number of picked-up persons corresponding to the recorded image is written in the registration column (recording the number of printing sheets) 76 of the printing condition registration list 70, and then, the pickup date and time are written in the registration column (pickup date and time column) 77 (step S4).

[0082] FIG. 11 is a flowchart showing a printing condition setting operation at the time of reproduction.

[0083] In the reproduction mode, when a first reproduced image is displayed (step T1), the image designation button 36 is pushed to designate a desired image (step T2), and then, the mode is transferred to the printing condition setting mode. At step T2, in the case where a key for feeding the image is pushed, the sequence proceeds to step T8, and the next image is displayed, and further, the sequence returns to the step T2.

[0084] At step T2, in the case where the printing image designation button 36 is pushed, the printing conditions are displayed in a state of overlapping with the reproduced image, and then, the user starts an operation for setting individual printing conditions (step T3).

[0085] After the printing condition setting is completed, when the shutter button is operated (step T4), the operation for setting printing conditions is completed with respect to one image, and then, printing conditions are updated with respect to a current image (step T5).

[0086] At this point of time, in the case where the user desires to finish the operation for setting printing conditions, the printing condition setting mode ends by operating a reproduction completion button (step T6). On the other hand, when pushing the shutter button, the next image is displayed (step T7).

[0087] In the case where the reproduction of all images is completed, the printing condition setting mode ends, and in the case where there is the next image, the sequence proceeds to step T8 to display the next image, and then, returns to the step T2.

[0088] FIG. 12 is a flowchart showing an operation in the case where the user arbitrarily sets printing conditions at the time of image pickup.

[0089] In a pickup mode (including a pickup waiting state), when the shutter button is operated (step E1), an image pickup process is carried out, and then, the



picked-up image is reproduced and displayed on the display section (step E2). Subsequently, the printing condition setting menu is displayed in a state of overlapping with the reproduced image, and then, an operation for setting printing conditions is carried out with respect to one image (step E3). After the printing conditions are set, when the shutter button is again operated (step E4), the setting data is updated, and then, the mode returns to the pickup waiting state.

[0090] In step T3 of FIG. 11 and in step E3 of FIG. 12, the operation for setting printing conditions with respect to one image is carried out on the aforementioned display screen shown in FIGS. 6A to 6C.

[0091] More specifically, when starting the operation for setting printing conditions, as shown in FIGS. 6A to 6C, the aforementioned menu for setting various printing conditions is displayed in a state of overlapping with the reproduced image. These printing conditions are successively selected with the use of the manipulation section 30 and the touch panel 41, and then, these setting data is changed.

#### Claims

1. An electronic camera system comprising:
  - an image pickup optical system (11) including a pickup lens and an image pickup device;
  - an input device (30) for inputting a printing condition by a user; and
  - a memory (50) which stores an image picked up by said camera optical system and is removable with respect to the electronic camera system, characterized by further comprising:
    - a memory controller (20) for writing the printing condition input from the input device in the memory so as to correspond to the image picked up by said camera optical system.
2. The electronic camera system according to claim 1, characterized in that the printing condition includes the number of printing sheets.
3. The electronic camera system according to claim 1, characterized in that the printing condition includes a printing size.
4. The electronic camera system according to claim 1, characterized in that the printing condition includes grouping of image to be simultaneously printed.
5. An electronic camera system comprising:
  - an image pickup optical system (11) including a pickup lens and an image pickup device;
  - an input device (30) for inputting a printing condition by a user; and
  - a memory (50) which stores an image picked up by said camera optical system, characterized by further comprising:
    - an output terminal (81', 82') for outputting the image and the printing condition corresponding to the image from said memory.
6. The electronic camera system according to claim 5, characterized by further comprising a display device (40) for displaying a subject image when inputting the printing condition.
7. The electronic camera system according to claim 6, characterized in that said display section (40) includes a touch panel (41) for inputting the printing condition with a finger touch.
8. An electronic camera system comprising:
  - an image pickup optical system (11) including a pickup lens and an image pickup device; and
  - a memory (50) which stores an image picked up by said camera optical system, characterized by further comprising:
    - a memory controller (20) for detecting a number of persons in the image picked up by said image pickup optical system and storing the detection result in the memory so as to correspond to the image picked up by the camera optical system; and
    - an output terminal (81', 82') for outputting an image and the detection result corresponding to the image from said memory.
9. A system comprising:
  - an electronic camera (100); and
  - a printer (61), characterized in that said electronic camera system comprises:
    - an image pickup optical system (11) including a pickup lens and an image pickup device;
    - an input device (30) for inputting a printing condition by a user;
    - a memory (50) which stores an image picked up by said camera optical system and is removable with respect to the electronic camera system; and
    - a memory controller (20) for writing the printing condition input from the input device in the memory so as to correspond to the image picked up by said camera optical system, and characterized in that said printer comprises:
      - a slot (62) in which said memory is mounted thereto and removed therefrom; and
      - a printing section for printing the image

stored in said memory in accordance with the printing condition corresponding to the image.

10. An image picking up and recording method characterized by comprising the following steps of: 5

picking up an image by an image pickup device; 10  
displaying the picked-up image;  
inputting a printing condition from an input section by a user; and  
storing the inputted printing condition in the memory so as to correspond to the picked-up image. 15

11. An image picking up and recording method characterized by comprising the following steps of:

reading an image stored in a memory; 20  
displaying the read image on a display device;  
inputting a printing condition from an input section by a user; and  
storing the inputted printing condition in the memory so as to correspond to the read image. 25

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FIG.1A

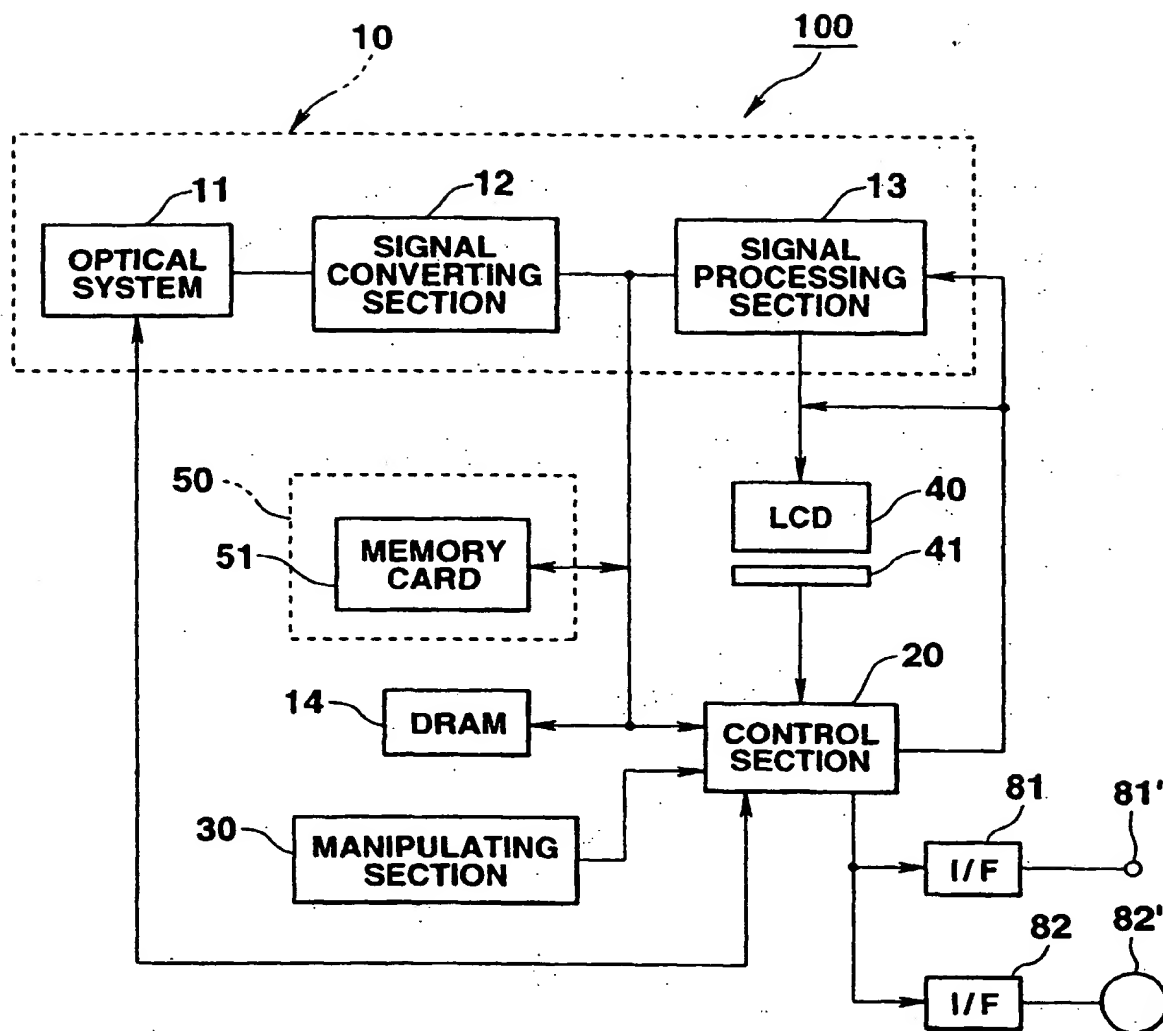
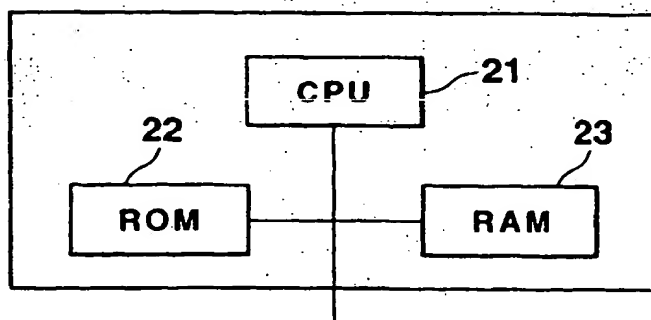
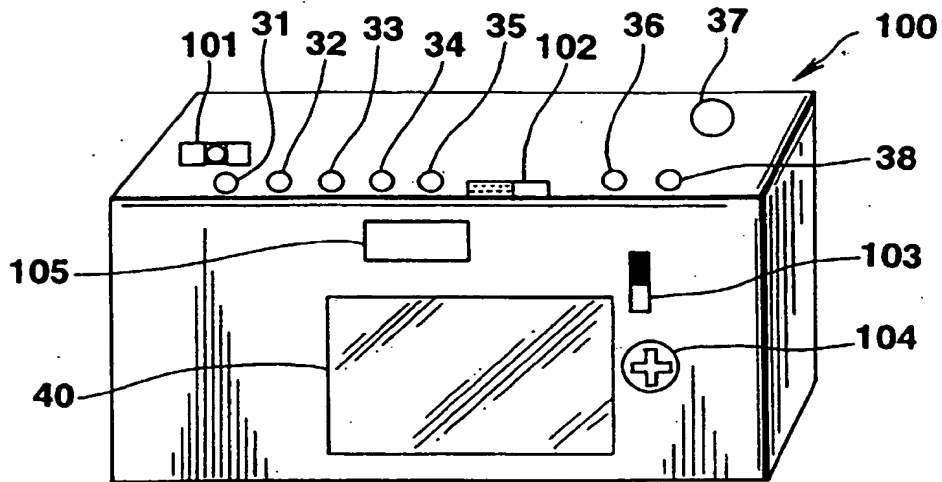


FIG.1B



**FIG.2**



**FIG.3**

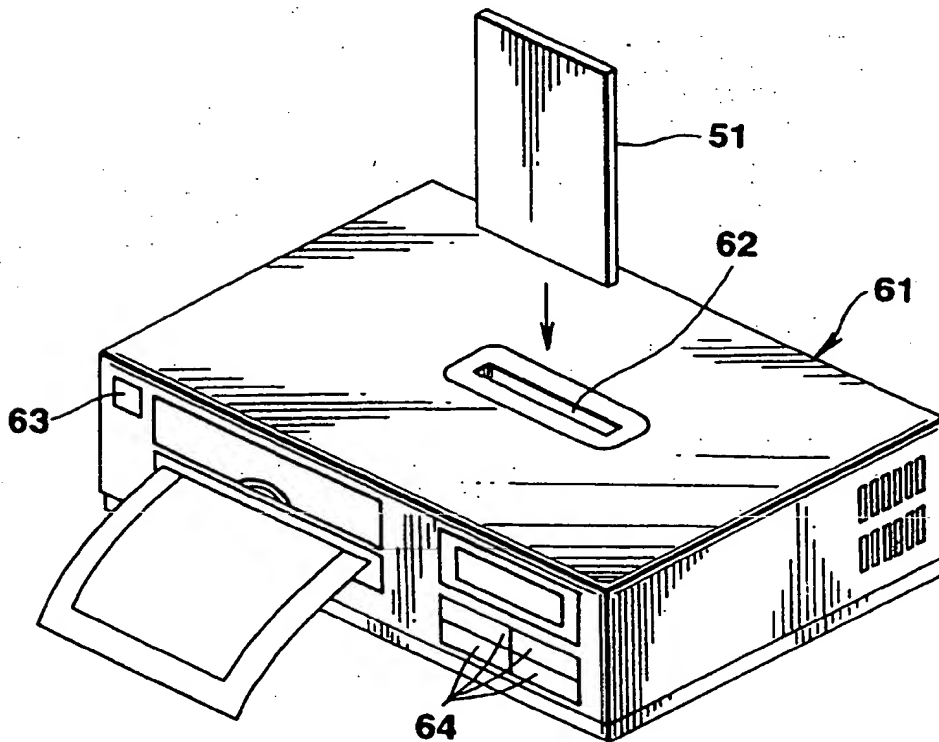


FIG. 4

70

71 IMAGE NUMBER	72 OUTPUT DESIGNATION	73 PRINTING DESIGNATION COLOR	74 PRINTING FINISH	75 PRINTING SIZE	76 NUMBER OF PRINTING SHEETS	77 PICKUP DATE AND TIME	78 IMAGE GROUP
1	1	1	3	2	3	97.10.10	1
2	0						
3	1	3	1	1	4		
4	0						
5	0						

FIG.5A

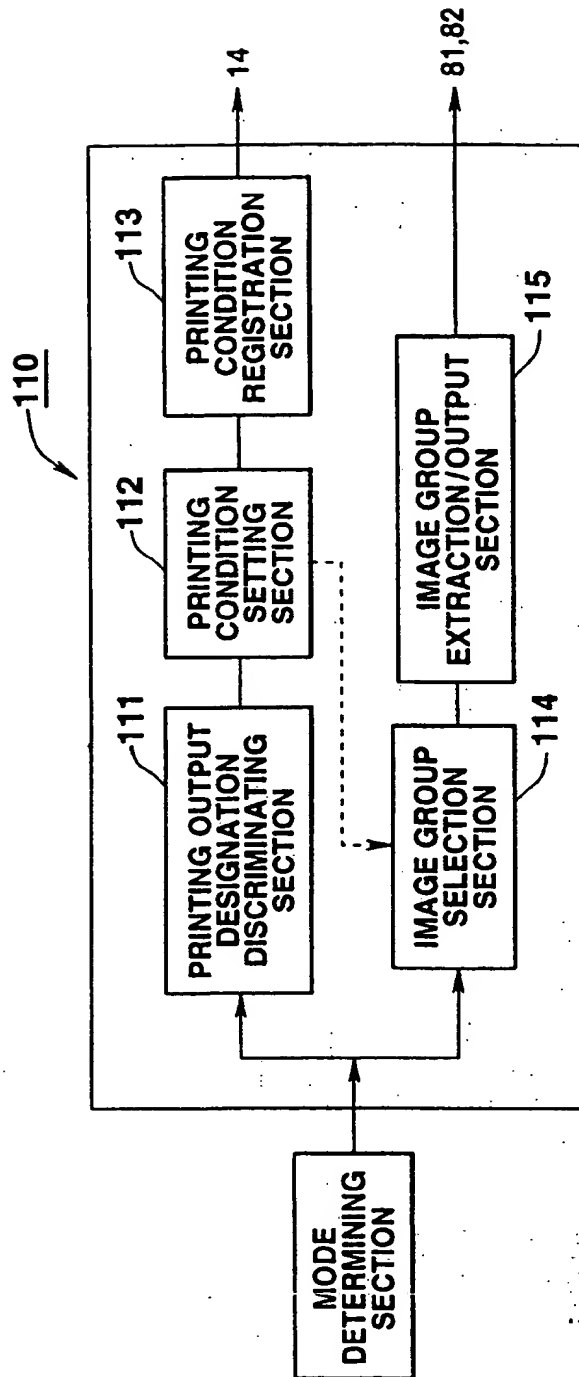


FIG.5B

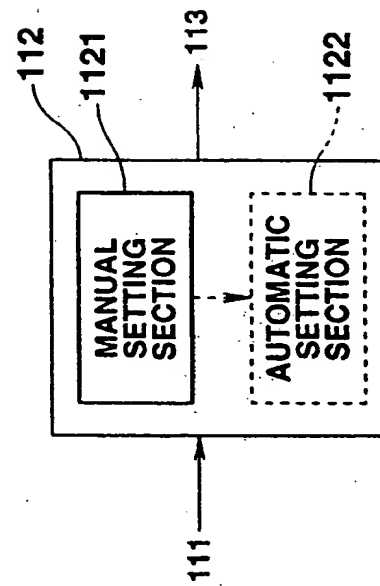


FIG. 6A

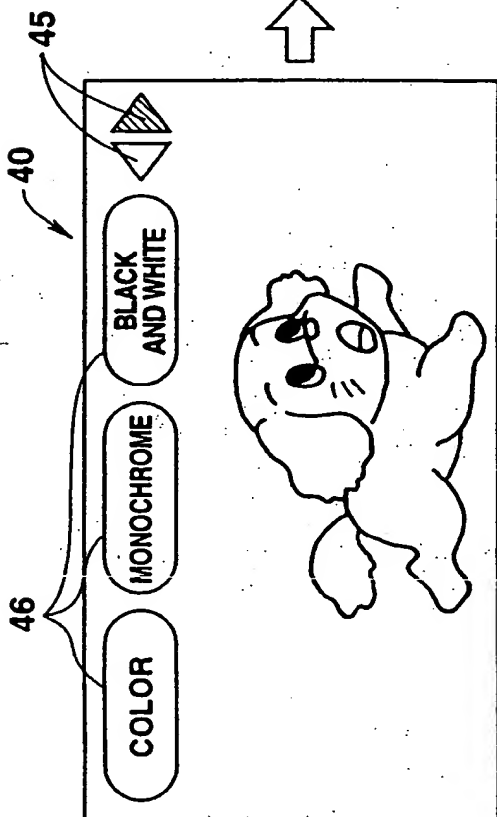


FIG. 6B

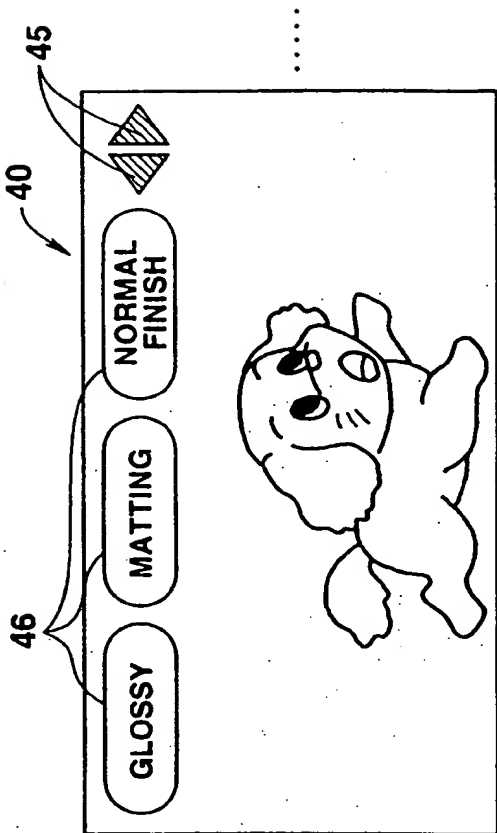


FIG. 6C

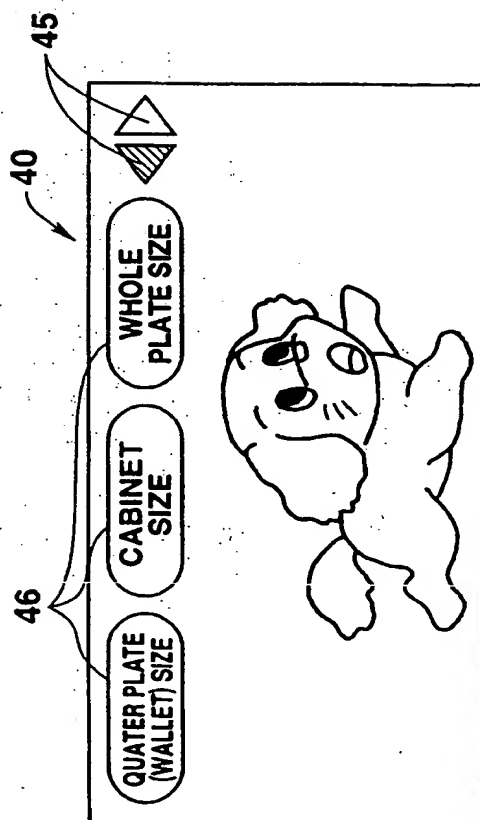




FIG.7A

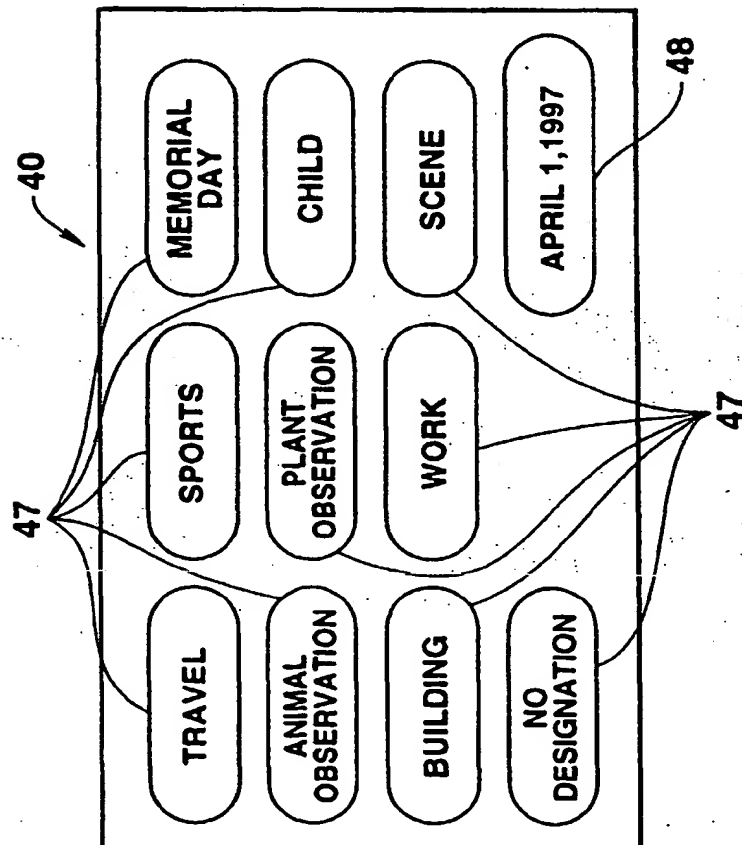


FIG.7B

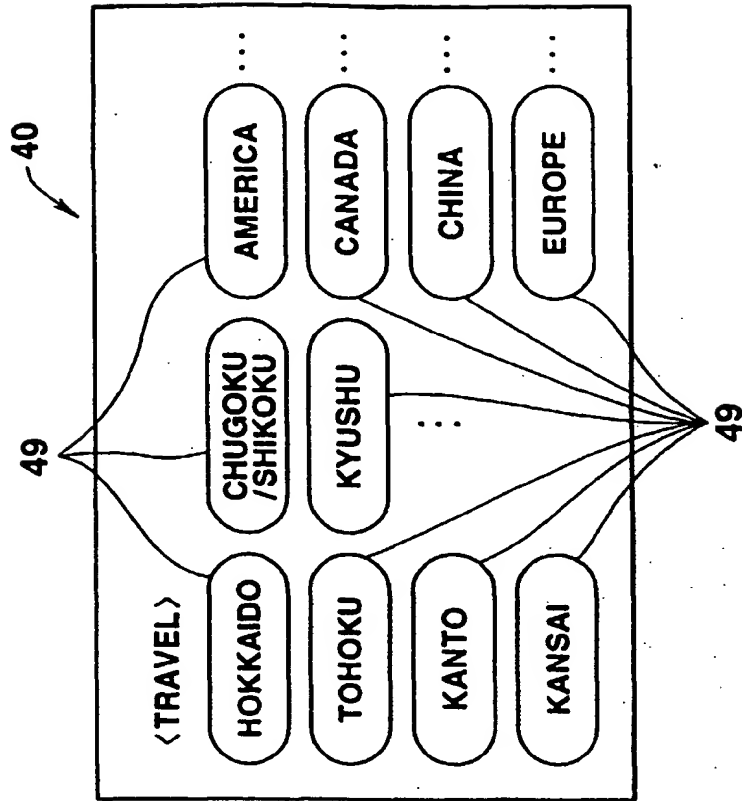
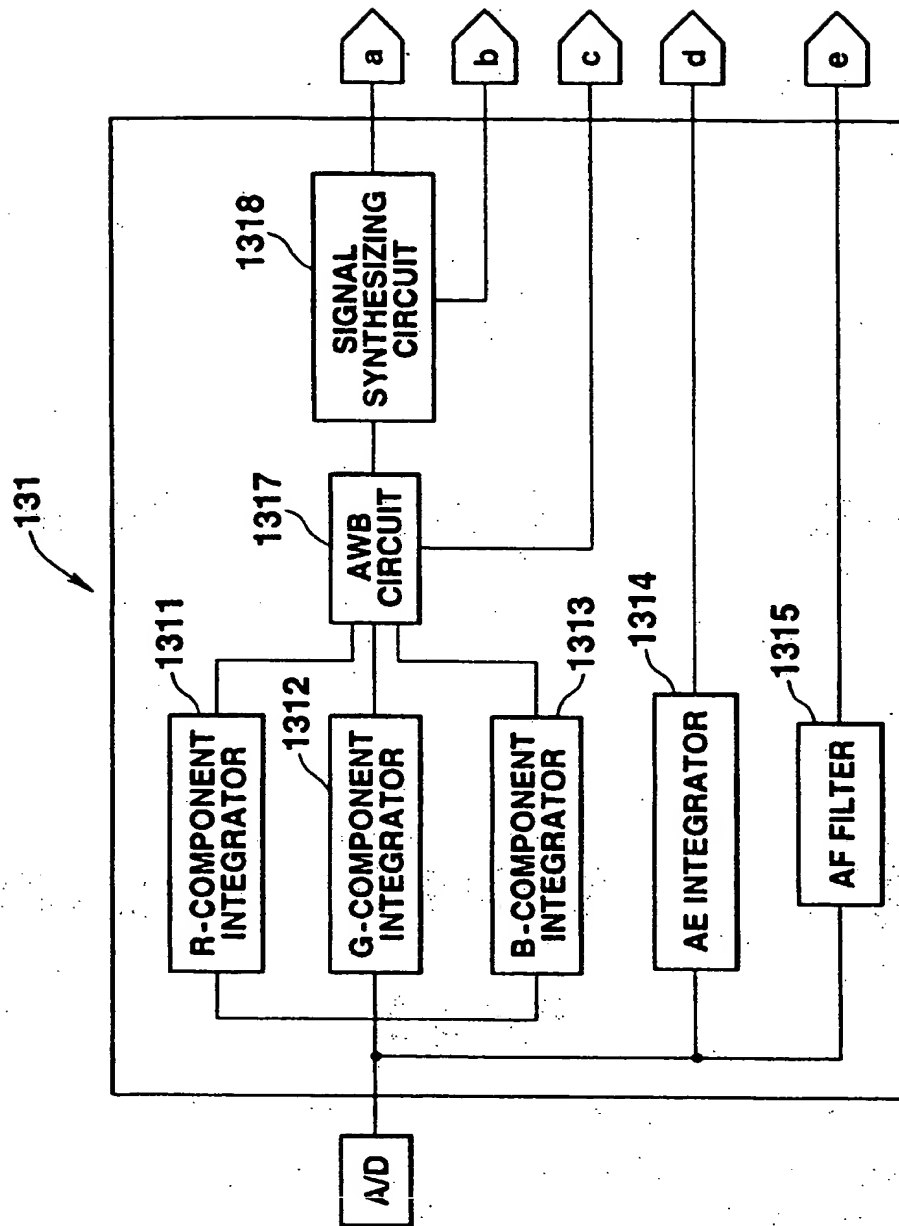
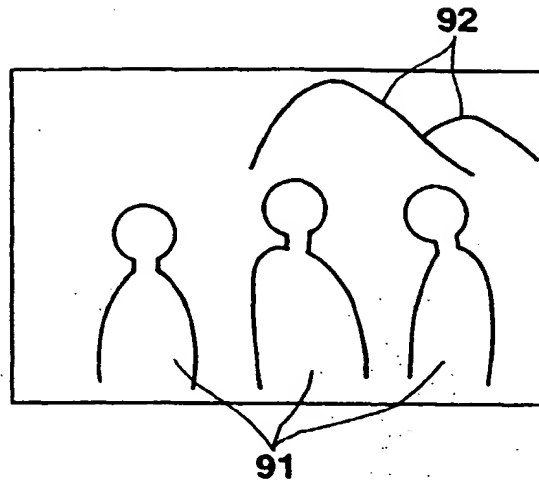


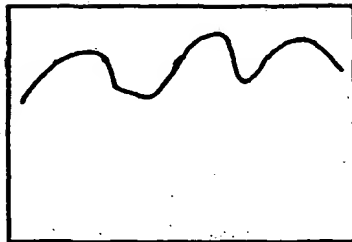
FIG.8



**FIG.9A**

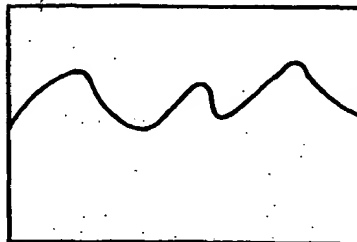


**FIG.9B**



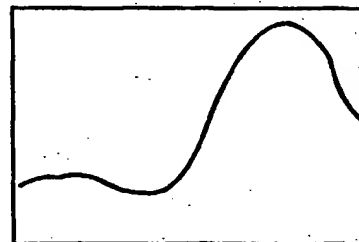
**Y-COMPONENT  
DISTRIBUTION**

**FIG.9C**



**Cb-COMPONENT  
DISTRIBUTION**

**FIG.9D**

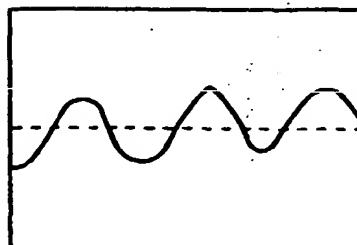


**Cr-COMPONENT  
DISTRIBUTION**

**FIG.9E**



**THRESHOLD  
VALUE**



**PERSON COLOR  
DISTRIBUTION CURVE**

**FIG.10**

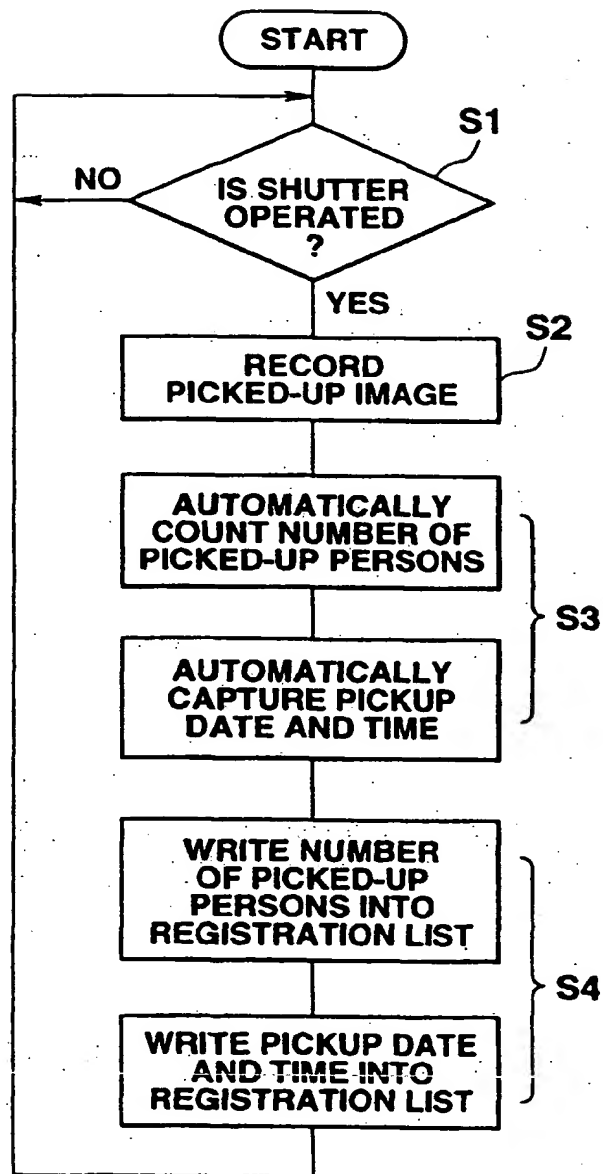


FIG.11

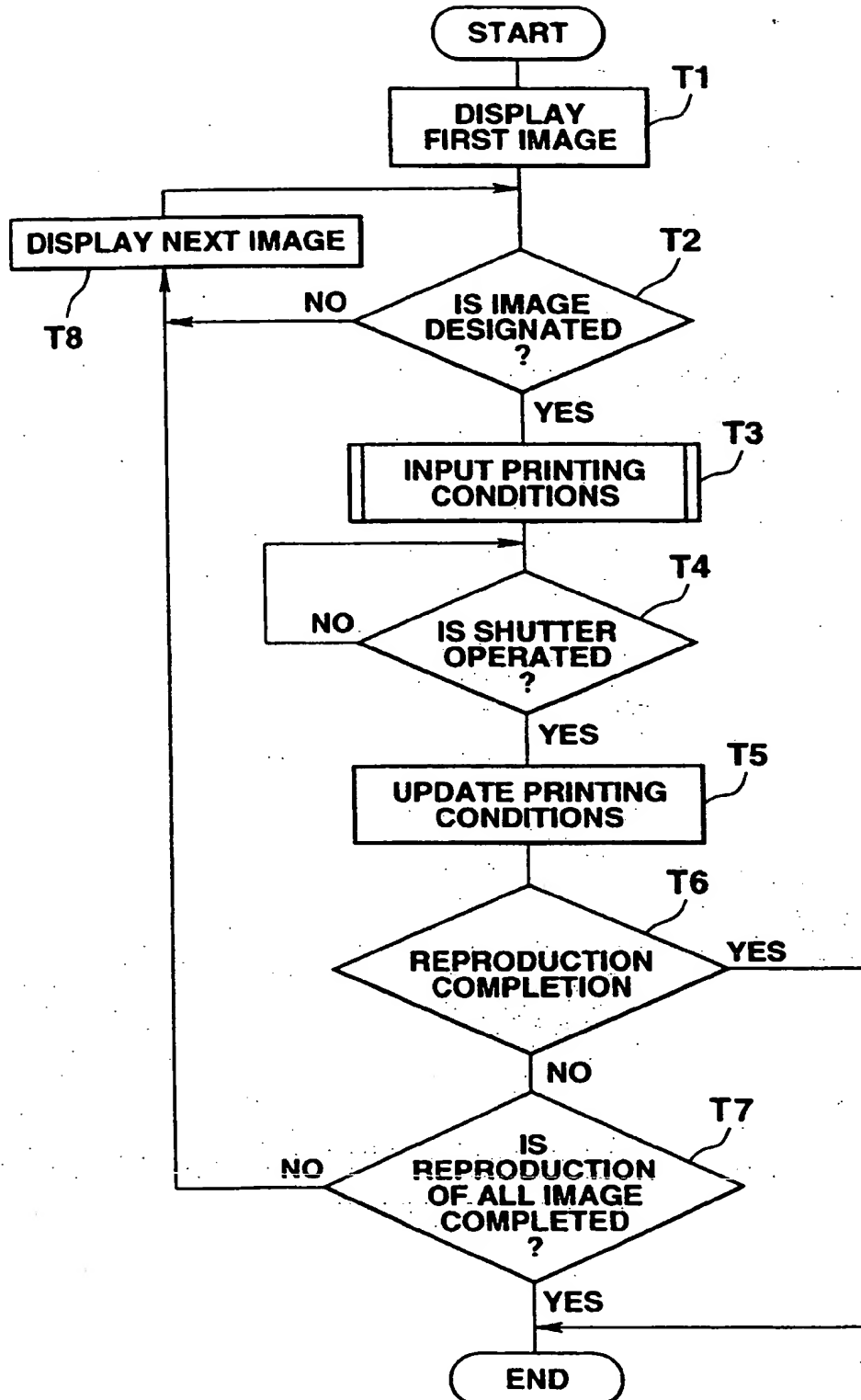
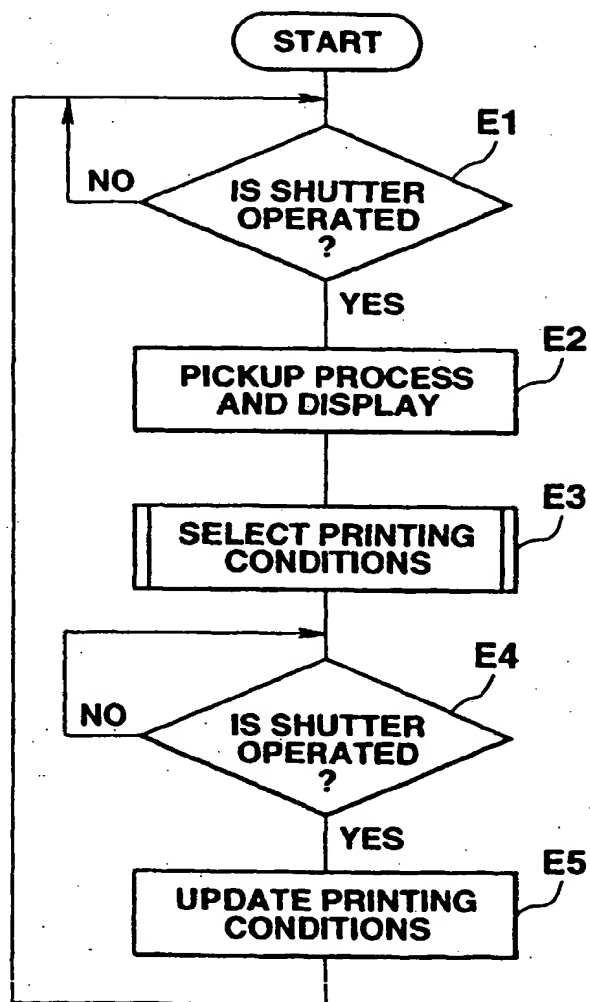
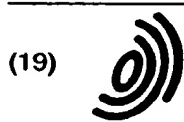


FIG.12





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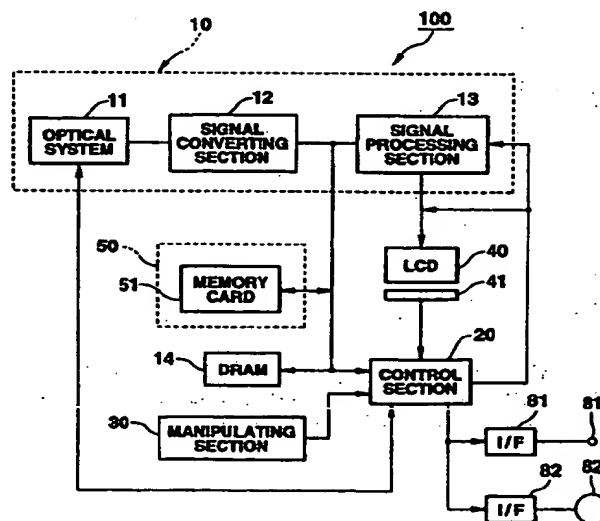
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(54) Electronic camera system

(57) According to the present invention, in an electronic camera system (100), when picking up or reproducing an image, a printing condition setting section (30) successively displays a printing condition menu in a state of overlapping with an image so that a user selects a desired menu. Printing conditions such as the number of printing sheets or printing size set by the user are recorded in a printing condition registration list on a memory card (51) related to the picked-up image or to an image read from the memory card, which is being reproduced and displayed. A printer system (61) prints an image according to a stored content when the memory card (51) is mounted onto a printer.

FIG.1A







European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 98 12 2004

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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Y	US 5 666 215 A (FREDLUND JOHN RANDALL ET AL) 9 September 1997 (1997-09-09) * column 4, line 46 - column 6, line 6 * * column 7, line 18 - line 21 *	1,3,5	
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A	US 4 655 577 A (IKUTA YOSHIHISA) 7 April 1987 (1987-04-07) * abstract *	9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H04N
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>19 April 2000</b>	Examiner <b>HAZEL J.F.</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document</p> <p>T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons A: member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/02 (P4/C01)



European Patent  
Office

Application Number

EP 98 12 2004

### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-7, 9-11



European Patent  
Office

**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number  
**EP 98 12 2004**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**1. Claims: 1-7,9-11**

**Electronic camera system with inputting of printing condition**

**2. Claim : 8**

**Electronic camera system with detecting a number of persons  
in the picked up image**

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 12 2004

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-04-2000

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